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unions, the peasant associations, the rural reconstruction experiments, and the Communist Party became the milieu in which the intellectuals began their new careers.

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During this period of social and political disorder, military men began to gain power, obtaining offices by virtue of their military success. Rather than despising the military as the older scholars did, many intellectuals began to seek similar careers as a means to power. This tendency began with the opening of the Huang-p'u (Whampao) Military Academy in Kwangtung for the training of officers for the 1923-27 campaign against the warlords. In the war against Japan the prestige of military men was greatly enhanced. A military career has now become a major attraction to ambitious intellectuals as a possible channel for social advancement. Chiang Kai-shek and Mao Tse-tung, who owe much of their popular success to their military skill, suggest the prestige granted military men in the modern period.

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III. SOCIAL STRUCTURE UNDER THE COMMUNIST REGIME

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The Chinese Communists interpret the existing social structure from a Marxist viewpoint and extoll the ideal of a classless society. Their belief that the transition to a classless society is inevitable justifies the liquidation of certain surviving classes.

872 As shown in Chart 1, the primary school consists of six grades divided into two levels. For students at rural schools, the first four years of primary school education may constitute an integral unit by itself and may be sufficiently useful if the students have to take up farming or other professions upon the completion of this unit. This feature was later attacked by the Communists as a mark of discrimination against the peasants and workers. But it is to be remembered that at one time the Nationalist Ministry of Education did attempt to revise the primary school system by making it a five-year one-level system.

• 874 Another feature of the Nationalist system of education attacked by the Communists was its failure to establish vocational schools with college standing, thus forcing vocational school graduates to terminate their education at the high school level. While most of the vocational school graduates did not continue their formal education, the system under the Nationalists did not preclude this possibility. The doors of the colleges were open to such graduates as were qualified for enrollment. The only restrictive factor was that most of the vocational school graduates because of their specialization had to take additional courses in order to fulfill general requirements before they could pass the entrance examination to the regular college.

871 By 1946, the Nationalist Ministry of Education announced 54.52 per cent of the nation's population above the age of six either had attended

3: Hinder G-5 (1933-1942) 1944 AF15 East China AF15

CHAPTER IX

TRAINING OF SKILLED WORKERS

• 874 COUNCIL OFFICIALS believed that the improvement of working conditions in industrial enterprises depends as much upon the acquisition of an understanding of the fundamental principles of mechanical operation by as many Chinese managers and workers as possible as upon the exercise of administrative controls. Study in engineering schools in Chinese universities of which the most important has been the Chiaotung University of the Ministry of Communications in Shanghai, and post-graduate study in European and American institutions have produced Chinese engineers able to undertake the technical direction of industrial enterprises. Since 1933, the Henry Lester Institute of Technical Education in Shanghai has played an important part in post-secondary school technical education; and in 1940 it was recognised as an institution of university standing in association with the University of London. But for the rank and file of workers in machine shops and factories there has been little opportunity for technical education.

Educational opportunities generally have been the prerogative of the more privileged Chinese families in the Settlement. Those who have completed a primary school course of six years have until recently been unusual among workers in industrial enterprises. There has been little development of more specialised technical instruction, which must be based upon several years of instruction in elementary school subjects.

Yet, mechanics and fitters are able to handle machine tools with skill, and install complicated machinery, although they lack a knowledge of the basic scientific principles upon which the operation of such machinery rests. From the point of view of an educationist, the teaching of these men presents a most interesting problem. In western countries a young man enters a machine trade after having completed his primary and perhaps early secondary school years. While working by day during the next four or five years, he attends a technical school at night, acquiring

3: Hinder G-5 (1933-1942) 1944 AF15 East China AF15

theoretical information for the intelligent handling of his tools. His manual skill comes gradually with practice during his adolescent years; his theoretical understanding increases concurrently. When he emerges from his apprenticeship, he not only can use machines but knows why they work as they do. Chinese mechanics, on the other hand, while possessing skill in handling machinery, have little understanding of the science of mechanics. It is to such men, keen, alert, and with practical experience, that a theoretical knowledge has to be brought. No teacher of elementary theory ever had pupils more developed in practice.

THE INDUSTRIAL AND Social Division recognised the necessity of instructing workers of various types. From 1937 onwards short-term classes were organised. These were experimental in many respects and were designed to discover what range of ideas could be absorbed, what methods of teaching would have to be employed, on what exact degree of preliminary education the instruction would have to be based, and what steadiness in attendance at night classes could be relied upon. By the end of 1940 the answers to most of these questions were known.

Four distinct groups of men had been enrolled in short-term classes during the four-year experimental period. Ten classes were held for boiler firemen, involving 528 men in all. These men operated boilers in industrial enterprises, apartment houses, and office buildings. Almost all of them were illiterate and poorly paid. They worked an extremely long day, almost invariably at least twelve hours, often longer. Their work was always tiring and, in the humid summer weather, often exhausting. Few had any conception of the immense pressure in the boilers they tended with so little concern. Some were known to believe that when the pressure gauge showed 70 pounds, this represented the total pressure in the vessel. The concept of pounds per square inch was unknown to them. Coal, once easily obtainable and cheap, rose to very high prices during the period when classes were arranged. No longer able to ignore waste in the operation of steam plants, the more alert factory managers recognised the need to plan for the use of expensive coal to the greatest advantage. Yet, so far as could be learned, little was done by the majority of enterprises to see that a better-educated man took charge of the firing of boilers. The

3: Hinder G-5 (1933-1942) 1944 AF15 East China AF15

874
633

Division did what it could under the circumstances. It took existing firemen and, in courses each of six weeks' duration and a total of twenty-four hours' instruction, gave them a rudimentary knowledge of the proper operation of boilers. The lecturers were boiler surveyors approved by the Council and regularly engaged in the inspection of steam plant installations. Visual methods of education had to be developed: slides were used at every lecture. To the sceptic who said, "but these men are illiterate, they cannot be taught anything," the obvious reply was, "but they mind boilers." Until factory management was prepared to pay for competent operators of steam plants, the Division instructed those who actually tended boilers. Several employers who needed new firemen sought those who had attended the training course.

A second group for whom two series of lectures were planned were those known as *lao kwei*—literally "old devils".[1] *Lao kwei*, relics of a simpler industrial scene in Shanghai, were still in many factories in charge of machine apparatus, including the steam plant. They often were not qualified engineers, for they belonged to a period when Shanghai had just embarked on machine-manufacturing processes and trained engineers were scarce. With the aid of mechanics skilled enough in practice but, as we have seen, without knowledge of such elementary matters as how accurately to calculate the size of a pulley and belt to obtain a given speed, *lao kwei* have installed complete plant machinery. The fact that during operation plants frequently have been shockingly mistreated and that there has been enormous waste has concerned neither the *lao kwei* nor their employers. There have been loss and waste in operation, and heavy replacements and repair charges, the elimination of which would in many instances have permitted occupation in more suitable premises and the payment of better wages. Some one hundred *lao kwei* and their assistants received instruction in courses lasting seventeen weeks.

A third group gathered into classes proved the most responsive of all, and indicated the direction of later policy. This group comprised the younger mechanics, machinists and fitters in machine shops, operating machine tools. There had been a distinct increase

[1] Use of this slang workshop term is widespread. The charge hand is called the "old devil," the next in charge is the "second devil," a foreigner a "foreign devil," a young worker a "small devil," and a spiral drill a "twisted fried-roll devil."

3: Hinder G-5 (1933-1942) 1944 AF15 East China AF15

[p.111]

874
633

in the variety and improvement in quality of locally manufactured machinery. Among units being manufactured in Chinese-owned plants were machine tools, power presses, air compressors, steam engines, screw- and nail-making machines, printing machinery, paper-making machinery, machinery for use in textile cigarette chemical, rubber and seasoning powder plants, in flour mills and steam silk filatures. Of the thousands of machinists and operating mechanics involved, few were found to have had any instruction in basic mechanical principles. Up to the end of 1940 experimental short-term classes of seventeen weeks, sixty-eight hours in all, had been held for two hundred of these men.

A fourth group consisted of the owners and foremen of plants using power presses in manufacturing. The range of hardware being produced in Shanghai was increasing as was also the manufacture of containers like tin cans and thermos flasks. Power presses were thus used extensively. There was, however, little knowledge of diemaking, of the heat treatment of steel, or of the measures which should be taken to reduce accidents on power presses. Some one hundred and fifty men engaged in the operation of power presses had six-week courses with twenty-four hours of teaching.

Commencing in the autumn of 1940, a first class of 52 men was admitted from among those mechanics and fitters who had already attended experimental classes and could pass entrance tests. They proved to be the advance guard of the regular three-year course which later developed. In the autumn of 1941, two evening technical schools for adult workers were opened, one in the eastern, one in the western industrial district, with 250 first-year students admitted. Despite the unemployment which descended on industry in December 1941, and in succeeding months, unemployment which early affected machine shops from which the majority of the students came and most of which were deprived of their sources of raw material, the schools withstood the shock, and 85 first- and second-year students completed the year's work in June 1942. The autumn of 1942 was to see also the beginning of classes for electricians, for in this field also complicated installations were operated by workmen without fundamental knowledge of the principles on which their work rests. It was hoped, year by year, to add some course of training, until the schools might merit the name of technical schools. A Shanghai which had constructed

3: Hinder G-5 (1933-1942) 1944 AF15 East China AF15

874
633

24-storey buildings should surely have courses of instruction in the building trades. These were next on the list to be provided.

To enter the Technical Schools, students must have completed their three years' apprenticeship in a machine shop in the case of mechanics, or in a factory manufacturing electrical equipment or with an electrical installation contractor in the case of electricians. They must then have passed an entrance examination which is approximately at a standard of completion of primary school.

The schools were financed from grants-in-aid funds of the Education Department of the Council. In addition to the primary and secondary schools which the Council provided for Chinese and foreign children, the Council each year distributed substantial sums as grants-in-aid, a mechanism used to induce in the schools which applied for them better standards of building and equipment and of teaching. The Grants-in-Aid Committee considered that the Division's schools warranted an expenditure of five per cent of all grants. The sum involved for 1942-43 was CRB $31,000.

The Educational Department of the Council, which had operated night primary schools for several years, modified the rules governing these schools so that they might become feeders for technical schools in the future. Older apprentices from machine shops were recruited to attend these night primary schools which thus became pre-technical schools.

Nowhere in the world is it a simple matter to operate night classes and to obtain completely regular attendance. When the ordinary crises in human affairs such as sickness and family difficulties do not intervene, overtime work often does. And in Shanghai in 1941 overtime work meant money which the family badly needed in days of high living costs. If men succumbed to the temptation to earn a little more, and were thus absent from classes, they could hardly be censured. If Shanghai is to build up an informed stratum of qualified mechanics, workers' earnings must reach a standard sufficient for family needs. The group for which technical education in western countries is usually designed is adolescent; it is generally free from the heavier responsibilities of family life. In Shanghai, however, classes for mechanics and fitters were for adult workers who had families to support.

3: Hinder G-5 (1933-1942) 1944 AF15 East China AF15

876
633

THERE WAS IN THE larger foreign enterprises a group of young workers who correspond more to the apprentices in western countries. They were generally known as trade apprentices (*i t'u*) and were found in such enterprises as public utilities and dockyards. Their apprenticeship was of fixed length, and regular teaching was available for them during this period. In an attempt to raise the standard of trade apprenticeship generally, the Engineering Society of China in 1940 recommended to the Shanghai Municipal Council the adoption of regulations governing the registration of such apprentices by the authorities. By the early part of 1941 one hundred applications from public utility enterprises had been received. For registration purposes, apprentices must have completed a junior middle school course prior to employment. It was hoped that the issue of a certificate by the Council at the close of the apprenticeship period would induce other enterprises to bring their regulations for apprenticeship into line with the new standards, thus making a contribution to better technical training. By 1942 it was apparent that the certificate was already becoming a desired credential.

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The curriculum in the Technical Schools took account of the fact that students had a considerable practical experience. There was no need to set up laboratory experiments to demonstrate a principle which could well be illustrated by referring to the actual work in the workshop. Lecturers were Chinese engineers who in most cases had had university training, but who also had moved among workers so that they could speak their tongue. It was essential that they be taught in the workshop colloquial as well as the dialect form they understood.

The first-year courses included physics, mathematics,—termed "workshop calculations",—and some technical terminology, through which some engineering principles were enunciated and machine parts taught. The colloquial Chinese workshop term was taught in relation to the correct Chinese engineering term and its English equivalent. In subsequent years, courses in machine shop practice, in strength of materials, in machinery installation and that of power plants were given.

Thus, by the paths indicated—by the path of the primary school, apprenticeship and evening technical schools leading to a graduation certificate, and by junior middle school with appren-

3: Hinder G-5 (1933-1942) 1944 AF15 East China AF15

874 ticeship in a large engineering plant which provided special instruction for its trade apprentices, leading to the certificate of the Division and of the Engineering Society of China—beginnings were made toward the production of the efficient and informed foreman. The technical training officers of the Division had the hope that they might play a part in creating modern technical education for China as a whole, an end toward which this experimental work would contribute.

These beginnings contained the seeds of large futures. They represented a recognition by the Settlement authorities of the necessity for technical training and education, and of the fact that something was owed to the worker on whom in the last analysis industry depends. The experience of industry transplanted to Free China has shown the correctness of this view; its success was largely dependent on the small force of skilled workers. There is a complete understanding by the Chinese Government, as it is making its post-war plans, of the necessity for worker training, looking to the period of re-occupation of the larger plants of the coastal areas when Japan will have been driven out. Loyal skilled workers in Shanghai who in 1942 resisted Japanese efforts to recruit them for Manchuria war industries, will be part of the industrial force of the future.

The scale of worker technical training in the future must be conceived in large terms. The experience which Western countries or countries like India have had in training within a short time large numbers of workers for wartime industries can be drawn upon with good effect. In Chinese machine shops, in-plant training with job sub-division could make workers rapidly expert in a few processes; and proper provision for graded experience could soon produce a worker with machine-operating skills. Instruction during employer time in fundamental mechanical principles should accompany plant training. There are heavy industries in Manchuria which must be manned by Chinese engineers, foremen and workers when this area is recovered. The industries of Tientsin, Tsingtao, Shanghai, Wusih, Hankow will all need skilled workers. The training of these in large numbers should be planned well in advance.

3: Hinder G-5 (1933-1942) 1944 AF15 East China AF15

to find employment as a means of assisting the family, but a friend or relative could frequently be found who, if challenged to do so by a skilled social worker, was ready to help out. There were no public funds to draw upon as is normal family casework in western countries; but there was being developed family case work on the China pattern, an attempt to use the close family bonds between relatives to induce help of the unfortunate. This kind of friendly help of course goes on day after day without stimulus from without; the difference was that the Division tried to harness it for the help of children in the emergency. The second phase of home finding sought to apply more widely the experimental beginnings in adoption approved by the authorities, the plan referred to earlier in this chapter. With more social workers on the task and with a gradually growing sense of responsibility on the part of the community for its children, as many as fourteen applications by adoptive parents were made on one day in June 1942 to adopt children.

This much more extensive programme than formerly attempted —a programme induced only by the emergency which in eight months left hundreds of children for whom adjustment had to be found in the hands of police—proved the value of early experimental beginnings. It cannot of course be claimed that even this enlarged staff would be able to handle the situation. Hundreds of children would continue to be destitute and begging, hundreds dying on the streets.

THE REMARKABLE WORK which has been done by the Chinese Government and voluntary organisations in caring for the thousands of children deprived of parental care during large-scale hostilities in China from 1937 to the present time has certainly within it the germ of an adequate child care programme in the future. It is work which has been carried on through immense difficulties of finance in a period of inflation. In Free China, as in Shanghai, there is growing a recognition of the necessity for adequately trained social workers in child care. Many students prevented from returning to China by world hostilities and for the time being remaining in the United States and elsewhere are using the time to prepare themselves as specialists in this field. In West China a special course in training for child care work has been organised

3: Hinder G-5 (1933-1942) 1944 AF15 East China AF15

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to commence at Ginling College in Chengtu in 1943, a co-operative effort of several educational institutions. Plans for the training of workers at present employed in children's institutions, whose initial educational standards usually are at a level such that a university course will not be possible for them, are in process of being worked out. In Shanghai special summer schools for these employed workers, men and women who have given devotedly of themselves to the children under their care, have proved useful and stimulating. From the great catastrophe which has befallen China and its children may well arise administrative and voluntary efforts which will mean a richer life for them.